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ABSTRACT

This report focuses on the employment of academic scientists and engineers from 1975 through 1976. The total number of scientists and engineers employed by universities and colleges is reported and discussed, broken down into type of activity, field of employment, type of control (public or private), and sex. (DT)

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Employment of Academic Scientists and Engineers Increases 3 Percent in 1976

Of the 2,210 institutions included in NSF's 1976 Survey of Scientific and Engineering Personnel Employed at Universities and Colleges, 1,915, or 87 percent, responded; NSF provided estimates for the remaining 295 nonrespondents. Among the 300 doctorate-granting institutions surveyed—which accounted for more than two-thirds of total employment of academic scientists and engineers—the response rate was even higher, 96 percent. Because of the excellent rate of response for these larger institutions, the rate of estimation made by NSF for the total number of scientists and engineers amounted to only 8 percent in 1976. However, since totals also include additional estimates by some of the institutions, small yearly changes should be reviewed with caution.

- Employment of all scientists and engineers at universities and colleges increased 3 percent between 1975 and 1976. The number of full-time scientists and engineers at academic institutions rose from 224,800 to 230,500 (a 3-percent increase), while the number of those employed part time grew from 55,900 to 58,700 (up 5 percent).
- The 1975-76 increase in full-time employment cut across all major fields, with increases ranging from 1 percent in the life sciences and engineering to nearly 7 percent in the social and environmental sciences.
- While scientists and engineers employed primarily as teachers increased 3 percent to 223,200 from 1975 to 1976, those engaged primarily in R&D activities rose by 2 percent to 51,000. For the longer period 1965-76, moreover, there was evidence of a significant shift toward teaching.
- Employment of full-time scientists and engineers at private universities and colleges totaled 68,400 in 1976, an increase of 2 percent over the 1975 level. The 1975-76 rise, although modest, stands in contrast with the near zero growth over the previous six years.
- The number of women employed full time as scientists and engineers increased 5 percent from 1975 to 1976, a rate more than double that for men.

Trends in Employment of all Academic Scientists and Engineers

Employment status. In January 1976 universities and colleges employed a total of 289,200 scientists and engineers, an increase of 3 percent over 1975 employment totals and the seventh consecutive annual rise since this data series began in 1965 (table 1).[1] From 1975 to 1976 the number of full-time scientists and engineers increased by nearly 3 percent to 230,500, while part-timers rose by 5 percent to 58,700.

[1] Data published in earlier reports have been adjusted downward to reflect the deletion in 1976 of historians from survey coverage. In 1975 they accounted for 5 percent of all scientists and engineers and 24 percent of the social scientists.

Table 1.—Characteristics of scientists and engineers employed at universities and colleges: January 1975 and January 1976

Item	1975	1976	Percent change
Total employment	280,600	289,200	3
By type of activity:			
Teaching	215,800	223,200	3
Research and development	50,000	51,000	2
Other activities	14,900	15,000	1
Full-time employment	224,800	230,500	3
By area:			
Engineers	22,600	22,800	1
Physical scientists	26,700	27,200	2
Environmental scientists	6,800	7,300	7
Mathematical and computer scientists	22,400	23,100	3
Life scientists	92,000	92,600	1
Psychologists	16,000	16,800	5
Social scientists	38,300	40,900	7
By type of control:			
Public	157,700	162,100	3
Private	67,000	68,400	2
By sex:			
Men	190,700	194,600	2
Women	34,100	35,900	5
Part-time employment	55,900	58,700	5

Source: National Science Foundation

(Prepared in the Universities and Nonprofit Institutions Studies Group, Division of Science Resources Studies)

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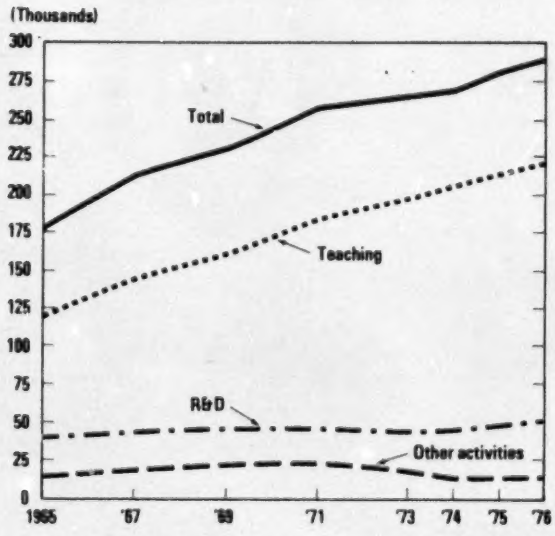
Type of activity. During the 11-year period 1965-76, the total number of scientists and engineers primarily engaged in teaching increased 83 percent—from 122,000 to 223,200—while those primarily engaged in R&D activities rose only 27 percent—from 40,000 to 51,000 (chart 1). The proportion in teaching grew during this time from 68 percent of all academic scientists and engineers to 77 percent, while the share of those engaged in R&D activities declined from 22 percent to 18 percent. Those employed in other activities such as agricultural demonstration work and dissemination of scientific information made up the remainder.

The number of teaching scientists and engineers increased 52 percent during 1965-71, or over 7 percent annually, while the number of R&D scientists and engineers grew by 21 percent, or at 3 percent per year. Although employment growth slowed for both types of activities during the next five years, the number of scientists and engineers primarily employed as teachers continued to rise at a considerably higher rate than did those engaged in R&D activities. During the 1971-76 period, teaching employment grew nearly 21 percent, or about 4 percent annually, while research employment grew only 6 percent, or 1 percent per year.

The increased growth in teaching as compared to R&D activities during the 1965-76 period is attributable, in part, to the slowdown in the rate of Federal funding of academic research during this time. Federal support, in constant dollars, slipped from an average annual growth rate of 5 percent during 1964-72 to a slight decline from 1972-75. The shift toward teaching also reflects a response to the demand for more teachers brought about by a doubling of total enrollment in higher education between 1964 and 1975. During that period the number of bachelor's and first-professional degrees conferred in the sciences and engineering nearly doubled, as did the number of 2-year colleges, where teaching accounts for 98 percent of employed scientists and engineers.

Chart 1. Scientists and engineers employed at universities and colleges by primary type of activity: January 1965-76



SOURCE: National Science Foundation

Employment Characteristics of Full-time Scientists and Engineers

Field of employment. The 3-percent rise in employment of full-time scientists and engineers from 1975 to 1976 was consistent with the modest 2-percent annual growth rate experienced since 1971. By major area, the 1975-76 increases varied from approximately 1 percent in the life sciences and engineering to nearly 7 percent in the environmental and social sciences.

Nearly 92,600, or 40 percent of all full-time scientists and engineers, were employed in the life sciences in 1976, about the same as in the previous five years. Medical scientists (including faculty teaching and performing research in university-affiliated hospitals) comprised the single largest employment category with 44,900, or 19 percent of all full-time scientists and engineers at academic institutions, about the same total as in 1975.

Another of the life sciences, the biological sciences represented the second largest employment category. In 1976 the biological scientists numbered 34,700, or 15 percent of total full-time scientists and engineers. In contrast to medical scientists, biological scientists showed moderate growth from 1975 to 1976, with a nearly 4-percent increase in employment.

Type of control. In January 1976 employment of full-time scientists and engineers at private institutions of higher education totalled 68,400, an increase of 2 percent over the January 1975 level. This one-year rise, although not large, contrasts with the "steady state" of private institution employment reported from 1969 to 1975. (The year 1969 was the first survey year in which data on control of the institution were available.)

Public institutions employed 162,100 full-time scientists and engineers in 1976, an increase of 3 percent over 1975, or somewhat lower than the 5-percent average for the entire 1969-75 period. The proportion of full-timers in publicly controlled institutions grew from 64 percent in 1969 to 70 percent in 1976, with a concurrent drop in the proportion of full-time employment in private institutions.

Sex. The number of women employed full time as scientists and engineers by universities and colleges numbered 35,900 in January 1976, representing the second consecutive annual increase of 5 percent since sex data were first collected for this study in 1974. By contrast, men, who outnumber women in total employment with 194,600 in 1976, recorded rate increases of only 2 percent in each of the last two years (chart 2). Despite the higher growth rate of women, there has been little change in their share of the full-time scientist and engineer total—up from 15 percent to 16 percent from 1974 to 1976.

From 1975 to 1976 the employment of women increased at a higher rate than that of men in every major

TABLE 2

FULL-TIME SCIENTISTS AND ENGINEERS AT FIFTY LEADING DOCTORATE-GRANTING INSTITUTIONS IN EMPLOYMENT OF SCIENTISTS AND ENGINEERS, BY EMPLOYMENT CATEGORY AND SEX: JANUARY 1976

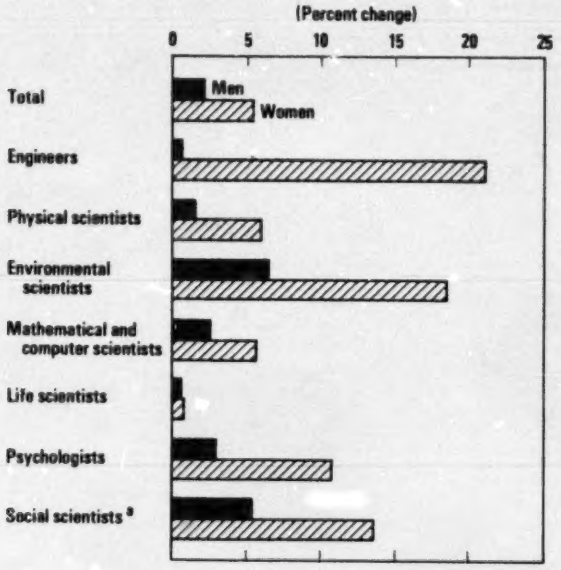
INSTITUTIONAL RANKING	TOTAL, ALL CATEGORIES		ENGINEERING		PHYSICAL SCIENCES		ENVIRONMENTAL SCIENCES		MATHEMATICAL SCIENCES		LIFE SCIENCES		PSYCHOLOGY		SOCIAL SCIENCES	
	GRAND TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN
TOTAL, ALL DOCTORATE-GRANTING INSTITUTIONS	154208	22940	16884	372	15496	964	4764	243	10393	1050	77948	15018	7479	1617	21262	3696
1 HARVARD UNIVERSITY	3090	429	50	2	235	15	34	3	58	7	2512	377	43	8	158	17
2 UNIVERSITY OF MICHIGAN	3041	732	338	21	258	35	96	5	102	7	1700	535	150	50	337	79
3 UNIVERSITY OF MINNESOTA	2801	456	183	0	160	10	64	4	140	12	1625	307	118	18	511	105
4 UNIV OF WISCONSIN-MADISON	2658	624	250	13	191	14	126	14	114	3	1377	394	223	77	371	109
5 OHIO STATE UNIVERSITY	2381	491	273	5	165	6	53	1	143	8	1484	438	47	3	246	30
5 UNIVERSITY OF WASHINGTON	2146	564	187	4	118	4	183	9	69	4	1411	513	44	11	134	19
7 UNIV ILLINOIS URBANA	2041	423	344	72	280	45	55	13	265	36	807	132	142	27	348	77
8 CORNELL UNIVERSITY	2020	325	255	5	125	4	44	2	40	1	1119	185	26	5	411	123
9 UNIVERSITY OF FLORIDA	1972	198	217	3	160	7	72	3	75	6	1136	111	63	18	249	50
10 JOHNS HOPKINS UNIVERSITY	1929	288	54	1	92	6	31	1	59	9	1521	228	30	7	142	36
TOTAL 1ST 10 INSTS.	24079	4530	2151	126	1792	146	758	52	1033	113	14552	3221	886	224	2907	645
11 PENNSYLVANIA STATE UNIV	1867	155	449	5	197	11	69	2	175	12	681	77	77	22	199	19
12 MASS INST OF TECHNOLOGY	1867	234	678	42	387	34	86	7	132	9	320	116	31	13	173	13
13 TEXAS A & M UNIVERSITY	1757	57	290	3	89	1	61	2	72	5	874	11	34	4	337	31
14 YALE UNIVERSITY	1754	519	60	1	129	8	38	3	53	4	1281	457	41	22	152	22
15 STANFORD UNIVERSITY	1717	305	235	6	145	4	37	0	65	6	1103	259	28	10	104	20
16 WASHINGTON UNIV ST LOUIS	1674	285	63	0	64	4	1	0	29	0	1426	280	26	3	65	9
17 UNIV OF TEXAS AT AUSTIN	1663	307	257	21	359	25	109	13	134	16	199	63	148	50	397	115
18 N C STATE UNIV AT RALEIGH	1600	350	196	1	61	3	16	0	110	6	1006	307	20	4	189	29
19 UNIVERSITY OF PITTSBURGH	1574	436	123	2	133	8	17	0	112	15	671	323	112	48	206	40
20 PURDUE UNIV ALL CAMPUSES	1561	130	334	9	208	11	24	1	154	15	561	77	85	14	195	13
TOTAL 1ST 20 INSTS.	40993	7316	4836	210	3569	255	1236	87	2049	210	22876	5180	1488	418	4924	956
21 MICHIGAN STATE UNIVERSITY	1555	191	118	0	173	5	35	0	129	11	714	119	115	22	271	34
22 U OF CAL LOS ANGELES	1516	195	154	3	163	7	51	3	69	5	781	145	65	10	235	22
23 AUBURN UNIV STATE UNIV	1433	266	91	1	153	13	49	1	102	10	915	88	133	33	432	122
24 U OF CAL BERKELEY	1368	165	294	8	197	13	18	0	84	6	467	88	45	10	263	40
25 UNIVERSITY OF CHICAGO	1335	247	29	0	104	9	39	3	76	5	847	201	46	15	190	14
26 CASE WESTERN RESERVE UNIV	1295	180	111	2	53	3	13	0	30	2	913	159	20	3	109	11
27 COLUMBIA UNIV MAIN DIV	1289	250	101	2	143	11	46	3	51	2	773	207	32	11	116	12
28 UNIVERSITY OF ARIZONA	1284	114	138	0	221	7	113	5	60	4	519	67	74	8	162	23
29 NEW YORK UNIVERSITY	1284	216	3	0	93	3	2	0	92	4	788	167	98	25	208	17
30 UNIV OF STHRN CALIFORNIA	1262	195	122	2	71	5	16	0	71	5	697	132	42	4	203	47
TOTAL 1ST 30 INSTS.	54996	9357	5999	228	5057	331	1659	109	2881	269	29787	6553	2158	559	7059	1298
31 UNIVERSITY OF KANSAS	1214	261	86	2	87	5	51	0	71	5	567	191	107	25	245	67
32 UNIV OF MD COLLEGE PARK	1214	203	134	5	272	20	42	3	134	13	366	68	77	56	202	38
33 UNIVERSITY OF IOWA	1213	144	85	1	74	0	13	0	62	5	816	116	30	5	153	13
34 UNIVERSITY OF COLORADO	1208	127	133	1	203	2	42	3	84	9	536	88	71	11	142	10
35 DUKE UNIVERSITY	1183	250	44	0	66	1	17	2	33	2	897	234	26	2	100	9
36 UNIV OF MISSOURI COLUMBIA	1160	109	121	0	71	4	19	0	44	0	741	86	35	5	144	14
37 U OF CAL DAVIS	1110	101	81	1	69	1	34	0	39	3	713	65	22	1	155	30
38 IOWA ST U OF SCI & TECH	1104	101	310	3	76	4	47	2	91	4	377	37	49	5	166	46
39 UNIV OF NC AT CHAPEL HILL	1094	134	0	0	127	6	50	3	79	9	673	93	44	11	110	12
40 TEMPLE UNIVERSITY	1088	230	27	1	70	6	0	0	74	8	588	132	117	34	212	47
TOTAL 1ST 40 INSTS.	66204	11017	7020	242	6179	382	1940	120	3597	342	36056	7627	2721	714	8694	1590
41 UNIVERSITY OF GEORGIA	965	84	24	0	95	6	33	3	64	7	532	41	93	15	154	12
42 WEST VIRGINIA UNIVERSITY	966	138	90	2	35	1	40	0	47	11	667	111	20	4	87	9
43 OREGON STATE UNIVERSITY	979	108	134	1	93	1	102	5	72	7	451	63	21	11	110	20
44 U OF CAL SAN FRANCISCO	914	233	3	0	0	0	0	0	2	0	911	232	1	1	0	0
45 UNIVERSITY OF HAWAII	908	331	78	4	71	5	68	2	43	2	376	74	42	6	230	40
46 VIRGINIA POLYTECHNIC INST	902	40	457	4	70	3	26	0	100	10	343	12	20	2	104	11
47 UNIV OF KENTUCKY ALL CAM	902	59	87	0	96	2	15	1	65	2	547	51	36	1	113	2
48 GEORGIA INSTITUTE OF TECH	867	36	506	11	159	4	10	0	84	0	22	4	12	1	104	12
49 U OF CAL SAN DIEGO	880	83	48	0	103	6	76	1	25	3	461	51	44	3	73	19
50 UNIVERSITY OF CONNECTICUT	868	107	92	1	73	7	22	1	44	4	461	71	59	5	127	17
TOTAL 1ST 50 INSTS.	75645	12690	8554	281	6973	417	2333	139	4153	394	40829	8318	3047	783	9796	1728
TOTAL ALL OTHER INSTS.	78773	10900	8562	111	8523	547	2431	104	6240	656	37119	6680	4432	834	11466	1968

NOTE: TABLE DOES NOT INCLUDE ANY LEADING INSTITUTION THAT (1) REQUIRED NATIONAL SCIENCE FOUNDATION ESTIMATES, OR (2) REQUESTED THAT ITS DATA BE HELD CONFIDENTIAL.

SOURCE: NATIONAL SCIENCE FOUNDATION.

field. The largest relative increases occurred in engineering at 21 percent, and in the social sciences and psychology at 13 percent and 11 percent, respectively. Because of the small number of women employed in universities and colleges as engineers, the increase had little effect on the overall employment pattern in engineering. However, gains recorded in the social sciences and psychology did affect the proportion of women in these fields. The percent of women employed as social scientists increased from 16 percent and 17 percent of all social scientists in 1974 and 1975, respectively, to 18 percent in 1976, while those employed as psychologists rose from a 21-percent share to 24 percent in this same period. No change was recorded in women's share of the life sciences total—they accounted for 20 percent in each of the three years—or in the physical and

Chart 2. Full-time scientists and engineers employed at universities and colleges, by field and sex: January 1975-76



[a] Excludes historians
SOURCE: National Science Foundation

environmental sciences total, where they represented 7 percent in each year.

Among the 50 leading doctorate-granting universities in employment of full-time scientists and engineers, the University of Michigan ranked first in the number of women employed in 1976. The proportion of women varied from a high of nearly 30 percent at Yale University to only 3 or 4 percent at Texas A&M University, Virginia Polytechnic Institute, and Georgia Institute of Technology (table 2). It should be noted that at any given institution, program emphasis greatly affects the employment pattern of women. For example, Georgia Institute of Technology, with its heavy emphasis on engineering (a field in which women average only 2 percent of the national total) shows a relatively small proportion of women employed. Yale's proportion of women, on the other hand, can be explained primarily on the basis that nearly three-fourths of its full-time employment were reported in the life sciences, the area of employment showing, by far, the largest total number of women employed.

The final report, *Manpower Resources for Scientific Activities at Universities and Colleges, January 1976* will be published in two volumes. *Detailed Statistical Tables* (NSF 76-321) is now available and the analytical report will follow in 1977.

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